## WHAT IS CLAIMED IS:

- 1. A field emission display device, comprising:
  - a faceplate and a baseplate;
- a luminescent phosphor coating applied to a lower surface of the faceplate to form phosphorescent pixel sites; and
- a cathode member formed on the baseplate to form individual electronemission sites which emit electrons to activate the phosphors, the cathode member comprising:
- a semiconductor layer overlying a substrate, the semiconductor layer including an emitter tip;

an aluminum layer surrounding the tip and incorporating nitrogen; an insulating layer surrounding the tip and overlying the aluminum layer; and a conductive layer surrounding the tip and overlying the insulating layer.

- 2. The display device of Claim 1, wherein the conductive layer comprises a second aluminum layer incorporating nitrogen.
- 3. The display device of Claim 1, wherein the cathode member further comprises a layer of grid silicon between the insulating layer and the conductive layer.
- 4. The display device of Claim 1, wherein the aluminum layer comprises an atomic composition of about 2% 10% nitrogen.
- 5. The display device of Claim 1, wherein the aluminum layer comprises an atomic composition of about 5% 8% nitrogen.
- 6. The display device of Claim 1, wherein the aluminum layer has a resistivity of less than about  $10 \,\mu\Omega$  cm.
- 7. The display device of Claim 1, wherein the aluminum layer has a surface roughness of about 300 Å to 400 Å.
- 8. The display device of Claim 1, wherein the aluminum layer is substantially hillock-free.
  - 9. A field emission cathode, comprising:a substrate;an emitter tip formed on the substrate;

an aluminum film overlying said substrate and surrounding said emitter tip, said aluminum film including nitrogen;

a gate layer formed above the aluminum film and surrounding said tip,

- 10. The cathode of Claim 9, wherein said gate layer comprises aluminum and nitrogen.
- 11. The cathode of Claim 9, wherein the aluminum film comprises an aluminum nitride subphase.
- 12. The cathode of Claim 9, further comprising a dielectric layer between the gate layer and the aluminum film.
- 13. The cathode of Claim 12, further comprising a layer of grid silicon between the dielectric layer and the gate layer.
- 14. The cathode of Claim 13, further comprising a semiconductor layer between the dielectric layer and the aluminum film.
- 15. The cathode of Claim 14, wherein the aluminum film comprises an atomic composition of about 2% 10% nitrogen.
- 16. The cathode of Claim 15, wherein the aluminum film comprises an atomic composition of about 5% 8% nitrogen.
- 17. The cathode of Claim 15, wherein the aluminum film has a resistivity of less than about 10  $\mu\Omega$  cm.
- 18. The cathode of Claim 15, wherein the aluminum film has a surface roughness of about 300 Å to 400 Å.
- 19. The cathode of Claim 15, wherein the aluminum film is substantially hillock-free.
  - 20. A method of forming a field emission display device comprising the steps of: providing a faceplate and a baseplate;

applying a luminescent phosphor coating to a lower surface of the faceplate to form phosphorescent pixel sites; and

forming a cathode member on the baseplate to form individual electronemission sites which emit electrons to activate the phosphors, the steps of forming the cathode member comprising: providing a semiconductor layer overlying a substrate, the semiconductor layer including an emitter tip;

depositing an aluminum layer on the substrate surrounding the tip and introducing nitrogen during depositing;

forming an insulating layer surrounding the tip and overlying the aluminum layer; and

depositing a conductive layer surrounding the tip and overlying the insulating layer

- 21. The cathode of Claim 20, further comprising providing a layer of grid silicon between the insulating layer and the conductive layer.
- 22. The cathode of Claim 20, wherein the aluminum layer comprises an atomic composition of about 2% 10% nitrogen.
- 23. The cathode of Claim 20, wherein the aluminum layer is substantially hillock-free.
- 24. The method of Claim 20, wherein said conductive layer is an aluminum film, and further comprising introducing nitrogen while depositing said aluminum film.
- 25. The method of Claim 24, comprising sputtering a substantially pure aluminum target in a chamber housing the substrate.
- 26. The method of Claim 24, wherein the conductive layer comprises an atomic composition of about 2% 10% nitrogen.
- 27. The method of Claim 24, wherein the conductive layer comprises an atomic composition of about 5% 8% nitrogen.
- 28. The method of Claim 24, wherein both the aluminum layer and the conductive layer have a resistivity of less than about 10  $\mu\Omega$  cm.
- 29. The method of Claim 24, wherein both the aluminum layer and the conductive layer have a surface roughness of about 300 Å to 400 Å.
- 30. The method of Claim 24, wherein both the aluminum layer and the conductive layer are substantially hillock-free.